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**UNITED STATES PATENT AND TRADEMARK OFFICE****BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES****RECEIVED**

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ANTZ LEVIN, BOSTO.  
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Ex parte SAMUEL WEISS, BRENT REYNOLDS,  
and JOSEPH P. HAMMANG

Appeal No. 2005-2594  
Application No. 08/479,796

**ON BRIEF<sup>1</sup>****MAILED****MAR 31 2006**

U.S. PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS  
AND INTERFERENCES

Before SCHEINER, ADAMS, and MILLS, Administrative Patent Judges.

MILLS, Administrative Patent Judge.

**DECISION ON APPEAL**

This is a decision on appeal under 35 U.S.C. §134 from the examiner's final rejection of claims 16-18, 32-52, 64-67, 70, 71 and 73-85. Claims 16 and 85 are representative and read as follows:

16. A method for producing myelin forming cells, comprising:
- (a) culturing a population of multipotent self-renewing central nervous system (CNS) neural stem cells in a culture medium containing one or more predetermined growth factors that induce multipotent CNS neural stem cell proliferation, wherein:
    - (i) the cells of the population are derived from primary CNS neural tissue by growth in culture medium containing one or more predetermined growth factors effective for inducing multipotent CNS neural stem cell

<sup>1</sup> An oral hearing was scheduled in this appeal for March 21, 2006. The merits panel determined a hearing was not necessary in this case and thus the appeal has been decided on the brief.

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proliferation without requiring oncogenic immortalization of the CNS  
neural stem cell,

(ii) the population comprises cells which stain positive for nestin, and

(iii) in the presence of differentiation-inducing conditions, the cells of the  
population produce progeny cells that differentiate into neurons,  
astrocytes, and oligodendrocytes; and

(b) causing a cell from the multipotent CNS neural stem cell population to come  
into contact with a demyelinated neuron, wherein the contact induces the cell  
to differentiate to a myelin-forming cell.

85. A method of treating a demyelination disease in a mammal, the method  
comprising administering an effective amount of a multipotent self-renewing central  
nervous system neural stem cell to the mammal.

The prior art references cited by the examiner are:

Milward et al. (Milward) "Isolation and Transplantation of Multipotential Populations of  
Epidermal Growth Factor-Responsive, Neural Progenitor Cells from the Canine Brain,"  
J. Neurosci. Research, Vol.50, pp. 862-871 (1997).

Mehler et al. (Mehler), "Progenitor Cell Biology: Implications for Neural Regeneration,"  
Arch. Neurol., Vol 56, pp. 780-784 (1999) .

Akiyama et al. (Akiyama), "Transplantation of Clonal Neural Precursor Cells Derived  
from Adult Human Brain Establishes Functional Peripheral Myelin in the Rat Spinal  
Cord," Experimental Neurology Vol. 167, pp. 27-39 (2001) .

#### Grounds of Rejection

1. Claims 16-18, 32-52, 64-67, 70, 71 and 73-85 stand rejected under 35

U.S.C. 112 , first paragraph for lack of enablement throughout the claim scope.

2. Claim 85 stands rejected under 35 U.S.C. 112 , second paragraph, as

indefinite.

## DISCUSSION

### Background

As summarized in the Brief, "the invention involves use of multipotent self-renewing central nervous system (CNS) neural stem cells to generate myelin-producing cells (independent claim 16, and claims that depend therefrom) and to methods and systems that effect remyelination (independent claims 43, 75 and 85, and claims that depend therefrom). See, e.g., page 40, line 9 -page 41, line 10; Examples 15; 16; 17. Appellants "identify and isolate CNS neural stem cell cultures, teach methods for proliferating and differentiating those cell cultures," and "teach methods for using those cultures in a variety of *in vitro* and *in vivo* applications (such as for making myelin-producing cells and for remyelination." Independent claims 43, 75 and 85, and claims that depend therefrom, claim that the neural stem cell cultures described in the specification may be used to form patches of myelin or to achieve remyelination in demyelinating disorders. (See, e.g., page 39, lines 9-13; page 42, lines 4-7; Example 15). Brief, page 4.

### Enablement

Claims 16-18, 32-52, 64-67, 70, 71 and 73-85 stand rejected under 35 U.S.C. 112 , first paragraph for lack of enablement throughout the claim scope.

The examiner acknowledges that the claims are enabled for in vitro applications of the claimed methods and culture system, "but does not reasonably provide enablement for *in vivo* applications of the claimed methods and culture system."

Answer, page 3. The examiner argues that the specification does not indicate how transplantation of neural stem cells to effect remyelination of neuronal axons could be used therapeutically to treat any disorder. Answer, page 4. The examiner further argues that “[n]o working examples demonstrate a therapeutic effect of the claimed methods for remyelination.” Id. The examiner states that the specification fails to provide any guidance relating to the amount of cells to inject, the site of injection, extent of cellular persistence, and duration of myelin expression to provide any benefit for any disorder. Id.

With respect to claims directed to “a method for producing myelin forming cells,” claims 16-18, 32-52, 64-67, 70, 71 and 73-84, we do not find the examiner has established a prima facie case of lack of enablement. It is well settled that “[t]he enablement requirement is met if the description enables any mode of making and using the invention.” Invitrogen Corp. v. Clontech Laboratories, Inc., 429 F.3d 1052, 1070 (Fed. Cir. 2005); Johns Hopkins Univ. v. Cell Pro Inc., 152 F.3d 1342, 1361, 47 USPQ2d 1705, 1714 (Fed. Cir. 1998) (quoting Engel Indus., Inc. v. Lockformer Co., 946 F.2d 1528, 1533, 20 USPQ2d 1300, 1304 (Fed. Cir. 1991)). Furthermore, “[t]he scope of [patent] claims must be less than or equal to the scope of the enablement. The scope of enablement, in turn, is that which is disclosed in the specification plus the scope of what would be known to one of ordinary skill in the art without undue experimentation.” Nat’l Recovery, 166 F.3d 1190, 1196, 49 USPQ 2d 1671, 1675 (Fed. Cir. 1999).

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The examiner clearly admits that with respect to in vitro embodiments, particularly the “method for producing myelin forming cells,” the claims are enabled. Thus, it would appear that the examiner admits that the specification enables at least a single mode of making and using the claimed invention, and that this is sufficient to satisfy the enablement requirement. The examiner provides no evidence to show that the method for producing myelin forming cells lacks enablement. With respect to these claims, in our view the scope of the claims bears a reasonable correlation to the scope of enablement provided by the specification to persons of ordinary skill in the art.

In view of the above, the rejection for lack of enablement of claims 16-18, 32-52, 64-67, 70, 71 and 73-84 is reversed.

#### Claim 85

Claim 85, directed to a method of treating a demyelination disease in a mammal, the method comprising administering an effective amount of a multipotent self-renewing central nervous system neural stem cell to the mammal, is of differing claim scope than the claims directed to a method for producing myelin forming cells.

Since claim interpretation will normally control the remainder of the decisional process, in considering the issue of patentability “analysis begins with a key legal question – what is the invention claimed?” Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1567-1568, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987). Appellants claim a “method treating demyelination disease” in claim 85. The specification describes the

result of such a treatment as "stimulating in vivo mammalian CNS neural stems cells to proliferate and the neural stem cell progeny to differentiate into neurons and/or ganglia." Specification, page 17. Thus it would reasonably appear that appellants specification describes a "treatment" in terms of remyelination of neural cells, amelioration of symptoms associated with demyelinated cells, and preventing further demyelination. Specification, page 14.

On the other hand, the examiner appears to have interpreted claim 85 as requiring a much grander and permanent therapeutic effect or cure. We disagree. First, the term "therapeutic effect" is not present in claim 85. Furthermore, in our view, the specification particularly exemplifies the desired result, remyelination of cells and restored properties of neural cells in an acceptable animal model, Example 15, pages 70-71.

The examiner argues that the specification does not indicate how transplantation of neural stem cells to effect remyelination of neuronal axons could be used therapeutically to treat any disorder. The examiner further argues that [n]o working examples demonstrate a therapeutic effect of the claimed methods for remyelination. Answer, pages 3-4. The examiner indicates that the specification fails to provide any guidance relating to the amount of cells to inject, the site of injection, extent of cellular persistence, and duration of myelin expression to provide any benefit for any disorder.

Appellants respond (Brief, page 7) arguing,

First, the specification contains detailed disclosure on how to transplant CNS neural stem - cell cultures. (See, e.g., Specification, page 36, line 10, to page 42, line 13; page 68, line 16, to page 69, line 18; page 78, line 17, to page 71, line 6; and page 96, line 12, to page 97, line 28). The specification also provides exemplary teaching of where to transplant the cells of the claimed invention. (See, e.g., Specification, page 38, lines 17-30). The specification makes clear that the described neural stem cells may be administered in undifferentiated format or as differentiated cells (see, e.g., page 40, line 30 -page 42, line 11) and provides a detailed discussion of the advantages of providing neural stem cell progeny that include both oligodendrocytes and astrocytes particularly for demyelinating disorders.

Moreover, the specification also teaches and discloses the types of diseases to which the methods of the invention are directed. (See, e.g., Specification, page 40, lines 9-18). In addition, the specification also provides working examples of neural stem cell transplantation in various disease models, including, e.g., myelin deficient rats, human neuromyelitis optica, and human Pelizaeus-Merzbacher disease, including a specific dosage of cells for administration into the exemplified animal model. (See, e.g., Specification, pages 68-70). Further, the specification also teaches and discloses how to monitor the transplanted cells. (See, e.g., Specification, page 39, lines 16-31).

We agree with the appellants that neural transplantation techniques are known in the art, as referenced in the specification, and that the specification would reasonably appear to describe and reference prior art neural cell transplantation techniques in various disease models. Thus, we find that the specification would have been understood by one of ordinary skill in the art as teaching how to administer an effective amount of a multipotent, self-renewing central nervous system neural stem cell to the mammal, as claimed.

As evidence of lack of enablement, the examiner puts forth Milward, stating, "[t]he authors report that the grafted cells integrated normally into the adult shaking pup cytoarchitecture. Yet despite all this, the clinical deficit of these animals was not ameliorated." Answer, page 4. It would appear, however, that the examiner has mischaracterized the teachings of Milward. Milward, page 868, col. 1, states that the "cells appeared to have integrated into the surrounding cytoarchitecture, with no evidence of rejection." In Milward, the adult pup was killed two weeks post transplant and a post-natal pup was killed 6 weeks post transplant. Milward, page 862, col. 1. Milward did not indicate that the shaking pup condition was not ameliorated, only that the pups were sacrificed after a short period of time in order to determine if remyelination was detectable and remyelination was detected. Thus we do not agree that the examiner's evidence, Milward, supports the position that no therapeutic effect was achieved.

The examiner also relies on Mehler. Mehler is cited as evidence that "normal adult brain may lack the appropriate environmental signals to allow neural progenitors to realize their broad lineage potential," and "it may be necessary to promote lineage commitment of progenitor cells in vitro prior to transplantation into a damaged brain." Answer, pages 4-5. However, appellants' specification, pages 68-69, evidenced that after neural stem cells were proliferated in vitro and implanted into rat vertebral lamina of the spinal cord, neural stem cells could differentiate into oligodendroglia and were capable of myelination in vivo. Thus appellants specification data would appear to contradict Mehler.



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Finally, the examiner states that Akiyama implanted differentiated cells obtained in vitro into rat spinal cord and obtained remyelination, but that appellants did not follow the procedure of Akiyama, and thus Akiyama does not support enablement of Appellants claims. Answer, pages 5-6. Again the examiner ignores appellants' specification data, pages 68-69, evidencing that after neural stem cells were proliferated in vitro and implanted into rat vertebral lamina of the spinal cord, that neural stem cells could differentiate into oligodendroglia and were capable of myelination in vivo.

In view of the above claim interpretation and discussion of examples set forth in the specification, we do not agree that the examiner has provided sufficient evidence to establish a prima facie case of lack of enablement of claim 85.

35 U.S.C. 112 , second paragraph

Claim 85 stands rejected under 35 U.S.C. 112 , second paragraph, as indefinite. The examiner argues that claim 85 is indefinite because the preamble recites a method of treating a demyelination disease and the body of the claim recites a step of administering an effective amount to a mammal. The examiner suggests that since there is no conclusory statement in the claim, it remains unclear what the cell administration is "effective" in doing.

While claim 85 could be more elegantly drafted, in our view one of ordinary skill in the art could discern from the preamble of the claim that the method of treating a

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demyelination disease in a mammal, was performed on a mammal having the demyelination disease and that the desired effect is remyelination. Thus we reverse the rejection of claim 85 for indefiniteness. We note, however, appellants have indicated in the Brief, page 11, that they would be willing to accommodate any claim amendment suggestion to clarify claim 85 language. It is recommended that upon return of the application to the examiner, that the examiner entertain any appropriate clarifying amendment to claim 85 which does not alter the claim scope.

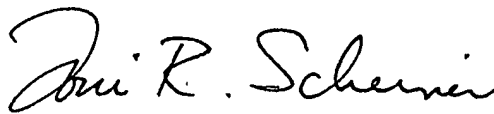
#### CONCLUSION

Therefore, the rejection of the claims for lack of enablement is reversed. The rejection of claim 85 for indefiniteness is reversed. It is recommended that the examiner consider appropriate clarifying amendments to claim 85, consistent with the discussion herein.

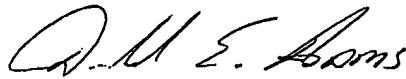
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No time period for taking any subsequent action in connection with this appeal  
may be extended under 37 CFR § 1.136(a).

REVERSED



TONI R. SCHEINER  
Administrative Patent Judge



DONALD E. ADAMS  
Administrative Patent Judge



DEMETRA J. MILLS  
Administrative Patent Judge

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